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10/066,463	01/31/2002	Hideaki Kurihara	FUJO 19.398	2188

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EXAMINER	
LERNER, MARTIN	
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15

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/066,463	Applicant(s) KURIHARA ET AL.	
	Examiner Martin Lerner	Art Unit 2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 November 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2 to 4, 6 to 8, and 10 to 15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2 to 4, 6 to 8, and 10 to 15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 2, 3, 6, 7, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Lee et al. ("A Study on a Reduction of the Transmission Bit Rate by U/V Decision Using LSP in the CELP Vocoder")* in view of *Gersho et al. ("An Overview of Variable Rate Speech Coding for Cellular Networks")*.

Regarding independent claims 2, 6, and 10, *Lee et al.* discloses a CELP vocoder device, method, and computer program, comprising:

"an LSP coefficient calculating unit calculating an LSP coefficient obtained from the voice signal" – line spectral pairs (LSPs) are calculated by LPC analysis of speech signal S (Pages 997, Right Column to Page 998, Right Column, II: Calculation of the LSP); Figure 4 shows a flowchart of the process includes a step called Extraction of LSP parameters (Page 999, Right Column: Figure 4);

"an LSP interval judging unit judging whether an interval on a frequency axis between the LSP coefficients is equal to or less than a prescribed threshold" – *int v(i)* is the LSP interval, where *int v(i)* = $| p_{i+1} - p_i |$, for a vector of LSPs $P = [p_1, p_2, \ldots, p_{10}]$

(Page 999, Right Column: Equation (18)); a test is made to determine whether min *int v(i)*, the minimum interval between line spectral pairs in an LSP interval vector *int v(i)*, is less than $F_s/4$, where $F_s/4$ is the threshold ("equal to or less than a prescribed threshold"); Figure 4 shows a flowchart of the process includes a step determining whether min *int v(i)* < $F_s/4$ (Page 999, Right Column: Figure 4); LSPs [$p_1, p_2, \ldots, p_{10}$] are points on a frequency axis, so *int v(i)* are intervals on a frequency axis;

"a judging unit judging whether a voice signal is a vowel when a voice part of a voice signal is sounded" – to decide U/V, the NL and the NH value are detected; in the case of NL is larger than NH, the speech spectrum is represented as a voiced speech spectrum; thus, the frame is decided to be voiced speech; in the other case of NH is larger than NL, the frame is decided to be unvoiced speech; that is, the unvoiced speech has formants in a high frequency band; however, some vowels' NH is larger than NL because vowels such as /i/, /I/, /ɛ/, /æ/ have high second, third, and fourth formants; such frames are decided by the existence of the first formant; if the LSP intervals are detected and are narrow, the frame is decided to be voiced sounds (Page 999, Right Column: Figure 4); thus, LSP intervals are employed to make special arrangements for some vowels by considering whether *int v(i)* < $F_s/4$ and a < b so the frame can be correctly classified as voiced; Figure 4 shows a flowchart of the process includes steps determining whether *int v(i)* < $F_s/4$ and a < b for these vowels (Page 999, Right Column: Figure 4).

Lee et al. discloses reduction of a transmission bit rate by U/V decision using LSP parameters when testing for some vowels. (Page 1000: Table 1) An overall bit

rate can be reduced because unvoiced portions can be encoded with 32 bits. However, *Lee et al.* does not specifically disclose a rate setting unit setting a voice encoding bit rate to a lower bit rate when a vowel is present. That is, *Lee et al.* omits "a rate setting unit setting a voice encoding bit rate, if the voice signal is a vowel said voice encoding bit rate is set to a bit rate lower than the bit rate usually used when the voice part is sounded." Still, variable rate speech coding is fairly well known for reducing an overall bit rate by encoding voiced and unvoiced sounds with different encoding algorithms. *Gersho et al.* teaches voice activity controlled variable rate coding, and particularly a Phonetically Segmented VXC, where each coding frame is analyzed to determine a set of features that are then used to phonetically classify the frame. A variable coding rate is set for different phonetic segments. Bits can also be saved in encoding sustained vowels sounds. (Page 174, Left Column) Thus, *Gersho et al.* suggests variable rate speech coding for phonetic segments including certain vowels in order to reduce the overall bit rate. It would have been obvious to one having ordinary skill in the art to include a rate setting unit setting a voice encoding bit rate to a lower bit rate when certain vowels are detected as taught by *Gersho et al.* in the LSP CELP vocoder of *Lee et al.* for the purpose of reducing the overall bit rate by changing the encoding algorithm for certain vowels.

Regarding claims 3, 7, and 11, *Gersho et al.* teaches a variable coding rate is set for different phonetic segments, where bits can also be saved in encoding sustained vowels sounds (Page 174, Left Column); a "sustained vowel" presumes parameters of

the speech signal (i.e. LSPs) for the vowel do not move and are constant for a given time period; also, *Gersho et al.* teaches switching between various rates based on whether a short-term quality measure remains constant as a function of time (Page 174, Left Column, First Full Paragraph, citing Lundheim and Ramstad).

3. Claims 4, 8, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Lee et al.* in view of *Gersho et al.* as applied to claims 2, 6, and 10 above, and further in view of *Kang et al.*

Neither *Lee et al.* nor *Gersho et al.* disclose using templates to determine whether a speech segment is a vowel, although templates are well known for identifying the phonetic content of a speech segment by comparing speech segment parameters to parameters representing a class of phonetic features stored in the template. *Kang et al.* teaches a voice communication processing system, where a filter coefficient table contains line spectrum pair (LSP) sets, and particularly filter coefficient templates representing vowels by line spectral frequencies. It is suggested representing speech parameters by LSP-based templates has the advantage of reducing the bit rate. (Column 5, Line 67 to Column 7, Line 50, and particularly Column 6, Line 66 to Column 7, Line 50) It would have been obvious to one having ordinary skill in the art to determine whether a speech segment is a vowel by comparing to templates of LSP coefficients as taught by *Kang et al.* in the LSP CELP vocoder of *Lee et al.* for the purpose of reducing a bit rate.

4. Claims 13 to 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Lee et al.* in view of *Gersho et al.* as applied to claims 2, 6, and 10 above, and further in view of *Das*.

Gersho et al. suggests that most of the coders in the TIA half-rate assessment have incorporated some type of phonetic segmentation. (Page 174, Last Full ¶) However, *Gersho et al.* omits specific disclosure of setting the encoding bit rate at half the usual bit rate when the voice part is a vowel. *Das* teaches a multimode speech coder, where voiced speech frames with sufficient periodicity are encoded spectrally at half rate, or 4 kbps. (Column 8, Lines 35 to 53: Figure 5: Steps 408, 412, and 416) The multimode coder makes a decision as to whether the frame is transition (T), voiced (V), unvoiced (U), or noise (N). If the frame is voiced (V), then the speech is processed under V mode, i.e. at half rate. The stated advantage is that the high-bit-rate T mode is used only when necessary, exploiting the periodicity of voiced speech segments with the lower-bit-rate V mode while preventing any lapse in quality by switching to full rate when the V mode does not perform adequately. (Column 14, Line 21 to Column 15, Line 9: Figure 9) Those skilled in the art would know that a vowel is the most common example of purely voiced speech, and has the most periodicity. Thus, *Das* suggests the bit rate can be reduced to half rate when the frame is voiced, which is commonly a vowel. It would have been obvious to one having ordinary skill in the art to set the voice encoding bit rate to half rate for a voiced frame, which is a vowel, as suggested by *Das* in the CELP vocoder of *Lee et al.* for the purpose of reducing the bit rate in a multimode coder without sacrificing voice quality.

Response to Arguments

5. Applicants' arguments filed 25 November 2003 have been fully considered but they are not persuasive.

Firstly, Applicants argue *Lee et al.* fails to teach or suggest a method adopted for the case where vowels continue. This position is traversed.

The claims don't say anything about the "continuity" of vowels, only whether the voice signal is a vowel. However, *Lee et al.* discloses vowels /i/, /I/, /ɛ/, and /æ/, which are continuing vowels. (Page 999, Right Column) Nor have Applicants drawn any distinction between continuing vowels and non-continuing vowels, claimed or unclaimed. The feature upon which Applicants relies, that the vowels are continuing vowels, is not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The Specification does not disclose "continuing" vowels. Moreover, *Gersho et al.* discloses bits can be saved in encoding sustained vowels. (Page 174, Left Column, 4th Full ¶) One skilled in the art would understand a voice part that continues to be a vowel, and that sustained vowels are equivalent to continuing vowels. Because the limitation of "continuity" of vowels is neither claimed not disclosed, the limitation of a "continuing" vowel cannot be read into the claims.

Secondly, Applicants cite Page 174, Left Column, 4th Full ¶, of *Gersho et al.* as suggesting that allocating more bits can be obtained with a modest increase in the

average bit rate. Applicants imply *Gersho et al.* discloses a coder using phonetic segmentation where more bits are allocated.

However, *Gersho et al.* is discussing allocating more bits to onsets. Those skilled in the art know an onset is similar to a transition. Variable rate coders common in the prior art classify speech frames into segments as voiced, unvoiced, transition (onset), and silence (background noise). An onset, or transition, contains particularly important information, characterized by the beginning of a consonant, such as "t" or "b", where distinguishing consonants from one another is especially difficult. *Gersho et al.* allocates more bits to onsets, so as to better characterize commonly confused consonants. Thus, the passage cited by Applicants is consistent with reducing the bit rate for vowels, which are a type of voiced speech, whereas the bit rate for onsets is increased, as onsets represents perceptually important and difficult to distinguish consonants.

It is noted that a multimode coder is an equivalent to a variable rate coder. *Gersho et al.* states a variable rate speech coder generates a transmitted data signal whose rate is not constant throughout the duration of a call. (Page 172, Right Column, 3rd ¶) The variable rate coder using phonetic segmentation as disclosed by *Gersho et al.* switches and reduces the bit rate for vowels. (Page 174, Left Column, 4th Full ¶) *Lee et al.* does not expressly disclose setting a rate for a variable rate, or multimode, speech coder, but a variable rate coder is implied. *Lee et al.* changes the number of bits used to encode the frame depending upon whether the frame is voiced or unvoiced. (Page 999, Right Column, Last Four Lines) Table 1 shows the result is an overall

reduction of the bit rate (bps) for a 5.3 kbps G.723.1 ACELP vocoder. Thus, *Lee et al.* suggests a variable rate G.723.1 ACELP vocoder.

Finally, with respect to *Kang et al.*, Applicants argue the invention simply determines its similarity by comparing a template with the LSP coefficient, but does not transmit an index number.

However, *Kang et al.* is merely cited to show identification of voicing frames by templates. The fact that *Kang et al.* additionally transmits an index for a template is not relevant to the rejection. Indices are a way of keeping track of the templates in *Kang et al.* Applicants' arguments attack the references individually, without addressing the basis of the combination. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). *Kang et al.* teaches templates have an advantage in speech coders by reducing the bit rate.

Therefore, the rejection of claims 2, 3, 6, 7, 10, and 11 under 35 U.S.C. 103(a) as being unpatentable over *Lee et al.* in view of *Gersho et al.*; of claims 4, 8, and 12 under 35 U.S.C. 103(a) as being unpatentable over *Lee et al.* in view of *Gersho et al.*, and further in view of *Kang et al.*; and of claims 13 to 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Lee et al.* in view of *Gersho et al.*, and further in view of *Das*, are proper.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to Applicants' disclosure.

Gao et al. discloses a speech encoder that adaptively selects one of a plurality of operating modes, including a half rate channel, based upon characteristics of speech classification as noise, unvoiced speech, and voiced speech, in order to generate better low bit rate reproduction. (Column 4, Lines 32 to Column 5, Line 9)

Marston discloses a mobile phone network that selects an appropriate bit rate for the parameters representing the user's speech from full bit-rate, intermediate bit rate, and a half bit rate. (Column 4, Lines 47 to 52)

7. Applicants' amendment necessitated the new grounds of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin Lerner whose telephone number is (703) 308-9064. The examiner can normally be reached on 8:30 AM to 6:00 PM Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9315 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

ML
April 1, 2004

RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER